

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
2 March 2006 (02.03.2006)

PCT

(10) International Publication Number
WO 2006/022858 A2(51) International Patent Classification:
H04L 12/28 (2006.01)

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(21) International Application Number:
PCT/US2005/009359

(22) International Filing Date: 22 March 2005 (22.03.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/555,217 22 March 2004 (22.03.2004) US

(71) Applicant (for all designated States except US): LANX-IDE TECHNOLOGY COMPANY [US/US]; 1300 Marrows Road, Newark, DE 19711 (US).

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(72) Inventors; and

(75) Inventors/Applicants (for US only): HOLLINS, Michael, J. [US/US]; 803 Baylor Drive, Newark, DE 19711 (US). MAY, Cameron, R. [US/US]; 1300 Marrows Road, Newark, DE 19711 (US). IRICK, Viril, Jr. [US/US]; 18 East Sixth Street, New Castle, DE 19720 (US).

(74) Agent: WYCHE, Myron, Keith; Connolly Bove Lodge & Hutz LLP, 1990 M Street, N.W., Suite 800, Washington, DC 20036-3425 (US).

Declaration under Rule 4.17:

— of inventorship (Rule 4.17(iv)) for US only

Published:

— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHODS FOR EXTRACTING TITANIUM METAL AND USEFUL ALLOYS FROM TITANIUM OXIDES

(57) Abstract: Titanium-containing metal is extracted from its oxide(s) by way of redox chemical reaction with a reducing metal. Specifically, an intimate mixture of the reducing metal and the titanium-containing oxide(s) is produced, in a preferred embodiment, by forming a metal-ceramic composite material featuring these two constituents. In a preferred embodiment, the composite body is made by infiltrating the reduced metal in molten form, into a permeable mass containing the titanium-bearing oxide(s). Concurrently or subsequent to infiltration, the redox reaction is carried out to transform the composite material, thereby forming a complex intimate mixture containing one or more oxides of the reducing metal, a titanium-containing metal, which could include an alloy of titanium with the reducing metal and/or one or more intermetallic compounds of titanium and the reducing metal, and possibly also some residual reducing metal, which itself possibly contains some titanium metal. One technique for removing the titanium-containing metal is to then comminute the transformed composite material while the metal constituent is still molten, such as by high speed shearing. The dispersed ceramic constituents can then be permitted to separate, and the metal component containing the titanium can simply be decanted.

A2

WO 2006/022858